# PROCEEDINGS

PICHAS 2016

# The First Padjadjaran International Conference on Halal Innovations

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October 13-14, 2016

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## GREETINGS CHAIR OF COMMITTEE

It is my great pleasure to welcome you here in Bandung, West Java, Indonesia to the first Padjadjaran International Conference on Halal Innovation. We are very grateful to the Rector and Director of Innovation and Academic Corporation and Business of Universitas Padjadjaran for their tremendous support they have provided and to the conference organizing committee for huge effort in engaging the program. We are also grateful to all of the speakers and participant for your extraordinary enthusiasm to participate in this event.

Halal market has increasingly grown across the world with both the increasing halal concern and muslim population growth as the main driving forces. To ensure halal compliance of food in the market, it is necessary to look at it from different point of views including method for halal analysis, methodology of halal food assessment, halal system management, screening of porcine/alcohol-based ingredients and alternatives of halal food ingredients. Therefore, all experiences of respective researchers, academicians, practitioners, government and professionals worldwide need to be gathered in a common unified voice in the form of a conference. Following the conference, it is expected to identify forthcoming chances and challenges with a view to strengthen halal food industry amongst muslim countries, establish a network, share idea and recent finding on halal food as well as launch Padjadjaran Halal Centre as the innovation center of excellent.

The conference will be held for two days and I sincerely hope you will enjoy the conference and have an interesting experience during your stay in Bandung.

Finally we thank for all parties participating in the conference.

Bandung, October 13 2016

Dr. Efri Mardawati

## CONTENT

*International Proceeding of :*
*The First Padjadjaran International Conference on Halal Innovation*
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# USE POTENTIAL OF LOCAL PROPOLIS EXTRACT AS HALAL BIOCOATING ON STORAGE OF DOMESTIC CHICKEN EGGS BIOCOATING AT ROOM TEMPERATURE

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## ABSTRACT

Eggs are livestock products which contribute significantly to the fullfil nutrition need of community, because of one egg contains nutrients is complete and easy to digest. However, eggs have a short shelf life and only lasted 10-14 days at room temperature. This research aims to develop a preservation method of egg which efficient and halal. In this research, egg of domestic chicken (Gallus sp.) was coated with propolis extract of Trigona sp. Propolis extracted with two methods which were ethanolic extraction followed with aquadest extraction prior to application. Propolis extract applied by immersed egg inside propolis extract for 15 seconds, 30 seconds 45 seconds and 60 seconds with eggs without any coating designated as control. Eggs were kept in room temperature and change in egg quality (e.g. shape index, shell thickness, height of air cell) measured at 0, 7, 14, 21 and 35 days after the immersion. In the same time, alcohol content were tested with ester formation and Iodoform test. The results showed that propolis coating did not effect shape index, however maintained good shell thickness and height of air cell. Furthermore alcohol test did not showed sign of alcohol all treatment groups. Based on this study, it could be concluded that application of propolis extract as egg coating may increase egg shelf life while comply with halal regulation.
*Keywords :* eggs, halal, biocoating, propolis extract.

## 1. INTRODUCTION

Eggs are one of most consumable livestock product due to their high nutrition value, relatively easy to cook and low cost (Hiroko, 2014). However, egg also considered as one of perishable product with low shelf life. In tropic, average shelf life of egg in room temperature between 10 to 14 days (Lestari et al, 2011). As high nutritious organic material, egg is susceptible to microorganisme contamination i.e. *Escherichia coli*, *Salmonella typhimurium*, *Shigella* during their production (Afifah, 2013). Even though most contamination occur at egg shell, these pathogens could difuse to egg interior and caused health problem.

Since eggshells are porous and breathable material; therefore they allow movement of moisture and carbon dioxide through the shell (Wong et al. 1996). This movement may cause physical and chemical changes in albumen and yolk and also weight loss (Copur et al. 2008). Studies showed that preventing this movement minimize detoriation in interior egg (Wong et al. 1996; Bhale et al. 2003). Study by Park et al. (2003) showed by combining washing, sanitizing, and coating could significantly increase the shelf-life of the eggs. Thus, application of coating that sanitize egg while reduce the effect of shell degradation would increase the effectiveness of egg preservation procedure. One of the potential coating is propolis.

Propolis is a sticky gummy resinous substance collected by worker honeybees (Apis melifera), at temperate regions, and Trigona sp., in tropical regions, from the young shoots and buds of certain trees and shrubs (Greenaway et al. 1990; Schmidt 1997). This substance known for having strong

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anti-bacterial, anti-fungal and anti-viral properties i.e. Bacillus sublitis, Bacillis alvei, Proteus vulgaris, Proteus galangin, Salmonella, Staphyloccus aureus, and Escherichia coli (Krell 1996; Bankova et al. 2000). Due to its anti-bacterial effect, propolis has been used on various agricultural product for protection during storage (Torre et al. 1990; Pastor et al. 2011; Zahid et al. 2013; Ali et al. 2014).

Previous studies showed propolis extract 2.5% could increased egg shelf life to 21 days by prevented albumin degradation and pathogen contamination (Purwati, 2015; Parwati, 2015). However, propolis extract used at previous study and most study were extracted with ethanol as solvent. This condition caused concern on the halal properties of egg. Thus, in this study we used different approach by apply aquades extract propolis (AEP) as coating for egg preservation. However since part of AEP involving extraction by ethanol, in this study beside test the effectiveness of propolis extract we also test the possibility of ethanol contamination at egg.

## 2. MATERIAL AND METHOD

In this study, propolis extract was applied to surface of brown egg shell. Three hundred eggs, with weight between 50-60 gram, were used in this study. Propolis used in study was *Trigona* sp. propolis obtained from local *Trigona* sp. farm in North Bandung.

**Propolis extraction**

Propolis was extracted by ethanolic extraction in which block of raw propolis of *Trigona* sp. mixed with 70% ethanol and kept inside dark bottle. The mixture then incubated with incubator shaker for 7 days to obtained early propolis extract.

Further extraction process conducted on early propolis extract by aquades to obtain Aquades Extract Propolis (AEP). About 200 ml of ethanol extracts of propolis mixed with 0.4024 gram $K_2HPO_4$, 0.9228 gram $KH_2PO_4$ 0,9228 and aquades until total volume of mixture about 500 ml for 20 min at 20°C. The mixture was centrifuged at 7000 rpm for 15 min and the supernatant was collected (Najafi et al. 2007). Collected then mixed with water to obtain 2.5% propolis-water mixture.

**Propolis extract application**

Eggs were dipped inside 2.5% propolis extract for 15 sec, 30 sec, 45 sec, and 60 sec. Eggs then kept at room temperature. Observation on some variables of egg quality namely shape index, shell thickness, and air cell depth were conducted at day 0, 7, 14, 21, 28, and 35. Shell index was measured by formula (Bell dan Weaver, 2002):

$$\frac{width}{height} x100\%$$

Alcohol contamination was tested by esther formation test and iodoform test. Alcohol test was conducted at day 0, 21, and 35.

## 3. RESULT AND DISCUSSION

Change in shape index indicated change in exterior quality of egg. In this study, we recorded value of shell index between 0.75-0.77 and that duration of immersion did not effect egg shape index (Fig. 1). Shell index recorded in this study was bigger than study of Bell and Weaver (2002) who reported shell index of 0.70-0.74 for normal eggs.

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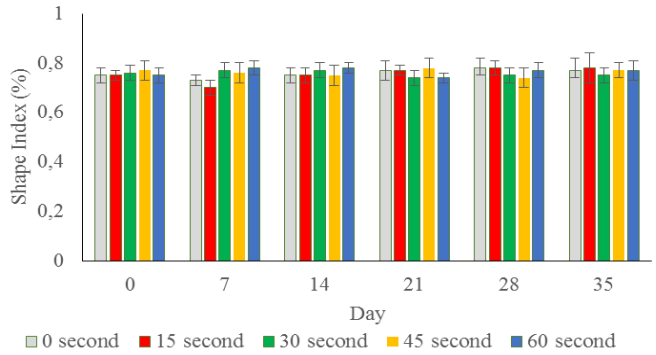


Figure 1. Change of shell index of eggs immersed inside propolis extract at different time

Egg shell thickness decrease with increase egg age. Good egg has thick shell which protect egg interior from microorganisms contamination. Thick shell also reduce rate of moisture loss. In this study we found that by immersed egg inside propolis extract for 60 sec could significantly reduce rate of shell thickness degradation.

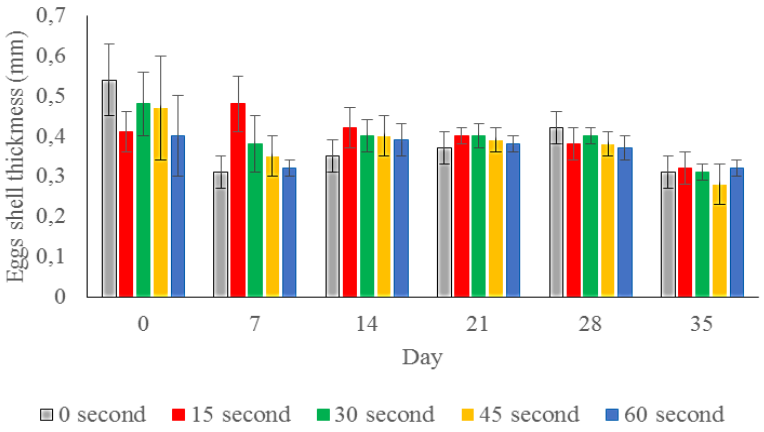


Figure 2. Change of shell thickness of eggs immersed inside propolis extract at different time

One of the component of egg quality is air cell depth. Low quality eggs has large air cell depth as result of degradation of yolk and albumin. In this study, lowest rate of air cell depth development was recorded for egg immersed inside propolis extraction for 60 sec (Fig. 3).

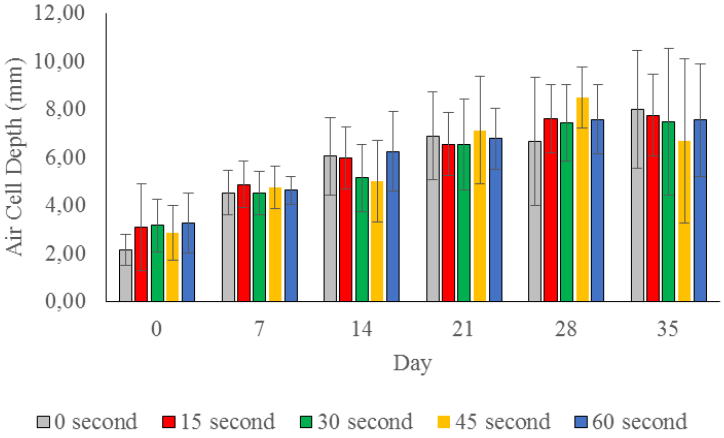


Figure 3. Change of air cell depth of eggs immersed inside propolis extract at different time

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This study also tested alcohol contamination for egg immersed inside propolis extraction for 45 and 60 sec (best propolis application method) with untreated egg as control. Based on esther formation test and iodoform test, all egg used during test did not show any alcohol contamination (Table 1).

Table 1. Alcohol content test of eggs immersed inside propolis extract at 45 and 60 sec.

| Treatment | Day 0 | | Day 21 | | Day 35 | |
|---|---|---|---|---|---|---|
| | Esther formation test | Iodoform test | Esther formation test | Iodoform test | Esther formation test | Iodoform test |
| Control | - | - | - | - | - | - |
| 45 sec. | - | - | - | - | - | - |
| 60 sec. | - | - | - | - | - | - |

Note: negative (-) indicated sample without alcohol contamination.

In Indonesia, definition of halal product based on Standarisasi Fatwa Halal published by Fatwa Majelis Ulama Indonesia No 4 Tahun 2003. Based on that, Ethanol as solution which not produce by khamr industry considered permissive to consume by moslem. Some islamic scholar also agree that ethanol application during food production is permissive (Najiha and Nadiah, 2014). Furthermore, result of this study also showed negative ethanol contamination which support the application of propolis extraction as solution for halal biocoating for egg preservation.

## 4. CONCLUSIONS

The results showed that propolis coating did not effect shape index, but effect shell thickness and height of air cell. Furthermore alcohol test did not showed sign of alcohol all treatment groups. Application of propolis extract as egg coating may increase egg shelf life while comply with halal regulation.

## 5. ACKNOWLEDGMENT

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